[7590-01-P]

NUCLEAR REGULATORY COMMISSION

[Docket No. 03038458; NRC-2012-0267]

License Amendment Request to Byproduct Material License 06-31445-01 for Light Sources, Inc., Orange, Connecticut

AGENCY: Nuclear Regulatory Commission.

ACTION: Environmental assessment and finding of no significant impact for license amendment.

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SUPPLEMENTARY INFORMATION:

I. Introduction

The U.S. Nuclear Regulatory Commission (NRC or the Commission) is considering the issuance of a license amendment to Byproduct Materials License No.06-31445-01 issued to Light Sources, Inc. (the Licensee), to approve of proposed alternate disposal procedures under section 20.2002 of Title 10 of the *Code of Federal Regulations* (10 CFR), for its facility located at 37 Robinson Boulevard, Orange, Connecticut (the Facility). License No. 06-31445-01 was issued by

the U.S. Nuclear Regulatory Commission on September 6, 2011, pursuant to 10 CFR Part 30. This license authorizes Light Sources, Inc. to possess and store lamps containing up to 4 kilobecquerel (kBq) (0.12 microcuries) of krypton 85 (Kr-85) prior to initial distribution.

Pursuant to the provisions in 10 CFR 20.2002, issuance of the license amendment would authorize the transfer of up to 200 lamps each year to a recycling facility that handles hazardous wastes, including mercury. The NRC has prepared an Environmental Assessment (EA) in support of this proposed action in accordance with the requirements in 10 CFR Part 51. Based on the EA, the NRC has concluded that a Finding of No Significant Impact (FONSI) is appropriate with respect to the proposed action. The amendment will be issued to the Licensee following the publication of this FONSI and EA in the *Federal Register*.

II. Environmental Assessment

Identification of Proposed Action

The proposed action would be granted under 10 CFR 20.2002 and approve the Licensee's September 9, 2011, license amendment request as modified in their letter dated November 17, 2011, by authorizing the transfer of up to 200 lamps per year, not to exceed 4 KBq (0.12uCi) of Kr-85 each, and utilizing a recycling facility that handles hazardous wastes, including mercury, for disposal. The mercury would be recycled and the krypton would be released by ventilation at the recycler.

Need for the Proposed Action

The Licensee needs this license amendment to allow disposal of up to 200 lamps per year at a waste recycling facility, authorized to process hazardous material, including mercury.

Environmental Impacts of the Proposed Action

The NRC staff reviewed the license amendment request to allow up to 200 lamps each year containing Kr-85, to be disposed at a hazardous waste recycler. Individual lamps vary in the amount of Kr-85 contained depending on the size and wattage of the lamp, but contain no more than 4 KBq (0.12uCi) of Kr-85 each. The Licensee estimates that no more than 7MBq (0.2mCi) of Kr-85 in intact lamps will be sent for disposal annually.

Characteristics of krypton gas are such that exposure to workers and the general public from Kr-85 vented from the lamps during the recycling process will have minimal effects. Since it is a gas, Kr-85 will immediately disperse once the lamp is broken. It is not considered an inhalation hazard and does not react with biological systems when inhaled. Due to the minimal risks presented, the NRC does not specify an Annual Limit on Intake (ALI) for Kr-85.

The Licensee provided the International Atomic Energy Agency report, “Assessment of the Radiological Impact of the Recycling and Disposal of Light Bulbs Containing Tritium, Krypton-85, and Radioisotopes of Thorium” (Jones, et al., 2011). This report was commissioned by the European Lamp Companies Federation, a forum developed to oversee the European lamp manufacturers, to assess radiation doses associated with the recycling and disposal of lamps containing small quantities of H-3, Kr-85, and thorium. This study considered a range of exposure scenarios in order to estimate the highest doses received by various individuals, including workers at facilities that recycle lamps, workers at incinerators, foundries, and landfill sites, as well as members of the public.

Highly conservative assumptions and parameter values were used for the dose assessment in this report in order to ensure that the doses calculated will not underestimate actual doses. The report assumes that Kr-85 associated with 1.5 million metal halide lamps and 1 million glow switches in first generation non-integrated compact fluorescent lamps are recycled annually. This quantity greatly exceeds the anticipated quantities of up to 200 lamps that the Licensee plans to recycle annually. Corresponding exposure times for various workers dealing with these greater quantities are also assumed to be much greater than the exposure times associated with lamps shipped by the Licensee for recycling.

Using the conservative parameter values, doses were calculated for workers in each of the processes used to recycle the lamps containing Kr-85 as well as members of the general public living near the recycling facility. The recycling workers' total effective dose was determined to be 0.5 μSv/yr (0.05 mrem) with the largest contribution coming from working within Kr-85 vapor while manually sorting lamps before the actual recycling process begins. The estimated dose to members of the public living near the recycling facility was calculated to be 4.0E-6 μSv/yr
(4.0E-7 mrem) for processing of 1.5 million lamps and 1 million glow switches. These doses are well below the NRC's annual dose limits for workers and the general public, and the dose from the estimated 200 lamps proposed by the licensee would be proportionally smaller (Estimated at less than 0.025% of the dose calculated in the report).

The environmental impact of sending 200 lamps to a recycler would result in sending a maximum 20,000 milligrams of mercury to a recycler. The amount being recycled is expected to be significantly less since the most commonly sold lamp contains 14 milligrams and much fewer than 200 lamps per year is expected to be sent to the recycler. This is a non-significant impact

on the environment. For comparison, a local recycler, NLR, reports that they have recycled 5,270,000 milligrams of mercury in a typical year. Thus the amount from the Licensee would result in a maximum increase of less than 0.38% per year. Recycling is an authorized disposal method for lamps containing mercury under the Universal Waste Regulations, 40 CFR Part 273. According to the "Mercury Emissions from the Disposal of Fluorescent Lamps", report (http://www.epa.gov/wastes/hazard/wastetypes/universal/merc-emi/merc-pgs/emmrpt.pdf) dated March 1998, the central estimated emissions from recycling mercury in lamps would be 10% elemental and 1.09% divalent mercury. Lamps from the Licensee are made with triple distilled mercury containing approximately 100% elemental mercury. The lamps being sent for recycling from the Licensee consist of bulbs that prematurely failed which leaves the mercury in an elemental state. Thus the maximum discharge to the environment from recycling 200 lamps would be a maximum of 2000 milligrams of elemental mercury.

Environmental Impacts of the Alternatives to the Proposed Action

The alternative to the proposed action is to deny the requested license amendment. The no-action alternative would leave things as they are, resulting in the material being disposed as mixed waste in accordance with Universal Waste regulations. The lamps would be sent to a licensed radioactive waste contractor which could result in the Kr-85 being discharged—an increase in the environmental impact— or recovered, depending upon the methods employed by the licensed radioactive waste contractor. With respect to the mercury, the environmental impact is that the licensed radioactive waste contractor could recycle the mercury, resulting in the same environmental impact as granting the license amendment or properly dispose of the mercury by using a Subtitle C landfill. According to the "Mercury Emissions from the Disposal of Fluorescent Lamps", report (http://www.epa.gov/wastes/hazard/wastetypes/universal/merc-emi/merc-pgs/emmrpt.pdf) dated March 1998, the estimated emissions from lamps being sent to a Subtitle

C landfill is 100% elemental mercury and 0% for divalent mercury. The resulting mercury discharge for up to 200 lamps from the licensee would be a maximum of 20,000 milligrams elemental mercury or ten times the amount discharged in recycling the lamps. Thus environmental impacts of either method are small, denying the amendment request would result in similar environmental impacts. The environmental impacts of the proposed action as compared to the alternative action are similar and therefore, the alternative action is accordingly not further considered.

Conclusion

The NRC staff has concluded that the proposed action is consistent with NRC regulations and guidance. The NRC staff reviewed the dose modeling analysis performed in the referenced report, which considers recycling activities for much larger quantities of lamps containing Kr-85. The report, which used extremely conservative parameter values in its assessment, calculates doses to workers involved in the recycling of these lamps as well as members of the public residing near the recycling centers that are significantly less than the NRC's corresponding annual dose limits. Since the quantity of lamps and the corresponding exposure times for workers recycling lamps from the Licensee are much smaller than those considered in the report the NRC staff is confident that the resulting doses to workers and the general public would also be proportionally smaller. Approving the proposed action would allow the Licensee to ship the lamps to a recycler for proper recycling of any of the recoverable mercury ensuring that the mercury is recycled. Recycling has shown to be the best method to recover elemental mercury which is the mercury contained in the Licensee's lamps. Because the proposed action will not significantly impact the quality of the human environment and will allow mercury that is recoverable to be recycled and not disposed, the NRC staff concludes that the proposed action is the preferred alternative.

Agencies and Persons Consulted

The NRC provided a draft of this Environmental Assessment to the State of Connecticut for review on April 25, 2012. On June 4, 2012, Connecticut Department of Energy and Environmental Protection responded by electronic mail. The State agreed with the conclusions of the EA, and otherwise had no comments.

The NRC staff has determined that the proposed action is of a procedural nature, and will not affect listed species or critical habitat. Therefore, no further consultation is required under Section 7 of the Endangered Species Act. The NRC staff has also determined that the proposed action is not the type of activity that has the potential to cause effects on historic properties. Therefore, no further consultation is required under Section 106 of the National Historic Preservation Act.

III. Finding of No Significant Impact

The NRC staff has prepared this EA in support of the proposed action. On the basis of this EA, the NRC finds that there are no significant environmental impacts from the proposed action, and that preparation of an environmental impact statement is not warranted. Accordingly, the NRC has determined that a Finding of No Significant Impact is appropriate.

IV. Further Information

Documents related to this action, including the application for license amendment and supporting documentation, are available electronically at the NRC's Electronic Reading Room at http://www.nrc.gov/reading-rm/adams.html. From this site, you can access the NRC's Agencywide Document Access and Management System (ADAMS), which provides text and

image files of NRC's public documents. The documents related to this action are listed below, along with their ADAMS accession numbers.

1. Licensee's amendment request letter dated September 9, 2011 [ML112560291]
2. Licensee's additional information letter dated November 17, 2011 [ML113250060]
3. Licensee's email attachment dated August 29, 2012 [ML12243A199]
4. Licensee's additional information letter received September 14, 2012 [ML12258A264].

If you do not have access to ADAMS, or if there are problems in accessing the documents located in ADAMS, contact the NRC Public Document Room (PDR) Reference staff at 1-800-397-4209, 301-415-4737, or by email to pdr.resource@nrc.gov. These documents may also be viewed electronically on the public computers located at the NRC's Public Document Room (PDR), O 1 F21, One White Flint North, 11555 Rockville Pike, Rockville, MD 20852. The PDR reproduction contractor will copy documents for a fee.

Dated at Region I, 2100 Renaissance Blvd., King of Prussia, this 25 day of October, 2012

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

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